

Research Article

A scoping review of human papillomavirus and cervical cancer knowledge, attitudes, practices, and prevention among female sex workers in Africa

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Background

Global initiatives have emphasized the elimination of cervical cancer (CC) among female sex workers (FSW) in Africa. Yet screening remains low, and few interventions have been outlined to target this group. This scoping review sought to understand the knowledge, attitudes, and practices (KAP) among FSW in Africa regarding human papillomavirus (HPV) and CC prevention, and to identify the most effective intervention strategies.

Methods

A systematic literature search was performed in PubMed, Scopus, Web of Science, and African Index Medicus for work published between January 2012 through August 2022. Eligible studies included those relating to HPV and CC prevention among FSW in Africa. Studies were categorized as KAP, intervention, or both. A Logic Model was used to guide content analysis of the interventions, and a thematic analysis of all studies was performed.

Results

The search resulted in 79 articles of which 11 were included in the study. Six African countries were represented including South Africa, Mozambique, Uganda, Kenya, Ethiopia, and Nigeria. Five of the articles described KAP, while the other six described interventions. The intervention studies were categorized into 3 groups: “screen and treat”, self-collection HPV testing, and a “diagonal intervention” which included a multi-faceted approach.

Conclusions

Limited literature exists regarding KAP and interventions for HPV and CC prevention among FSW in Africa. While FSW in the literature had a moderate level of knowledge regarding HPV and CC prevention, studies identified a lack of detailed and nuanced knowledge. Successful uptake of screening was seen when services were provided at convenient locations, integrated into routine or HIV care, and recommended by healthcare providers. Future interventions should be context-specific, include improved counselling and education, and be integrated with other services.

Cervical cancer (CC) is the fourth most prevalent cancer in female persons worldwide with over 600,000 new cases and 342,000 deaths recorded in 2020 alone.^{1,2} With the implementation of treatment and prevention programs, many regions of the world have seen a dramatic decrease in incidence and mortality over the past 30 years. Yet, absolute

cases have continued to rise globally, and incidence and mortality rates vary substantially from region to region.³ Of the 342,000 deaths reported in 2020, over 90% occurred in low- and middle-income countries (LMICs).^{1,2} Many of these regions have limited access to prevention measures such as vaccinations and early detection and treatment ser-

vices.¹ The highest CC burden falls on Sub Saharan Africa (SSA) which accounts for around 20% of all worldwide cases and 25% of the global CC mortality burden.^{1,4}

Over 90% of CC is caused by the human papillomavirus (HPV) which is the most common viral infection of the reproductive tract.¹ HPV is a ubiquitous and highly transmissible DNA virus that infects epithelial tissues.⁵ Over 200 HPV strains exist that have the potential to cause a range of clinical conditions in human hosts from subclinical infection to benign cutaneous lesions to invasive cancer.⁵ It may be transmitted via skin-to-skin contact or through sexual intercourse.⁶ Of those who sexually contract HPV, many will display no changes while others may display genital warts or mild cervical abnormalities with 90% clearing the virus within 2 years.⁷ A minority will have persistent infection with HPV and these individuals are at much higher risk of developing an advanced, precancerous lesion and subsequently cancer.⁷

HIV infection exacerbates the likelihood of developing CC, with a 6-fold increase in risk for females living with HIV.⁸ Female sex workers (FSW) are at high risk for contracting HPV and HIV which consequently places them at increased risk of developing CC.^{9,10} Studies have reported prevalence of HPV among FSW from around 23% to over 71%.^{10,11} Some of the major underlying risk factors faced by FSW include multiple sex partners, beginning sexual intercourse at a younger age, unprotected sex, and sexual violence.¹⁰⁻¹⁴ Further, FSW are less likely to seek health services, with stigmatization remaining as one of the many barriers they face in accessing care.^{15,16} Because of these intersecting vulnerabilities and healthcare access barriers, FSW are more likely to contract HPV, but may be less likely to have it diagnosed or treated at an early stage. This delay in diagnosis and/or treatment leads to the development of lesions and progression of the infection.¹⁷ Due to the nature of sex work and reports of higher pay for sex without a condom, there is concern that FSW may also contribute to the spread of HPV to the general population.^{11,18}

Screening is an essential control and prevention strategy. A “screen-and-treat” approach has been implemented across many countries in Africa. Yet screening uptake, primarily achieved through visual inspection with acetic acid (VIA), remains low.^{19,20} The most recent guidelines from the WHO recommend the use of HPV testing including self-sampling as a more appropriate first line screen for identifying females at high risk for CC.^{1,21-23} HPV testing is a simpler process, more cost effective, and provides more objective results than VIA.²² HPV testing has higher sensitivity than VIA which may be a more effective screening tool for high-risk individuals.²⁴⁻²⁶ Furthermore, HPV self-testing has comparable efficacy to clinician-collected HPV testing and has been preferred by women in many studies as it provides more patient privacy.²⁷⁻³⁰

Due to low screening rates in LMIC settings, there is an urgent need to better understand the KAP of FSW regarding HPV and CC as well as the most effective intervention strategies to target FSW to prevent HPV and CC. The purpose of this scoping review is to summarize the existing literature on the KAP of FSW in Africa regarding HPV and

CC prevention and to understand interventions that have previously been implemented among FSW in the region. A scoping review was chosen due to the heterogeneous nature of the studies, testing, and interventions as well as the limited available literature on the topic. The results of the review will inform future research and help guide future clinical and public health program development.

METHODS

The review followed the methodological framework described by Levac, Colquhoun, and O'Brien which advances on the previous approach by Arksey and O'Malley.³¹⁻³³ PRISMA guidelines were followed for the development of the study with the complete protocol available in Appendix S1 of the Online Supplementary Document.³³ We completed a multi-step approach that included the following: (1) identify research question, (2) identify relevant studies, (3) select studies, (4) chart the data, (5) summarize & report results, and (6) discuss implications for future research, policy, and practice.

STUDY IDENTIFICATION, SEARCH, AND SELECTION

The ‘Population, Concept, and Context’ (PCC) model aided in the conceptualization of the research question and is depicted in [Table 1](#). The search strategy, including database determination and search terminology, was co-developed between the first author and an experienced medical research librarian to ensure fidelity of the search. The final search terms were reviewed by three additional authors for confirmation. A comprehensive literature search was then performed in four databases: PubMed, Scopus, Web of Science, and African Index Medicus on August 31, 2022. The following key terms were used for the search and modified for each database: (1) ‘sex workers’, (2) ‘cervical cancer’ or ‘human papillomavirus’, (3) ‘Africa’, and (4) ‘intervention’ or ‘knowledge’ or ‘attitudes’ or ‘practices’. The search was restricted to articles in the English language published between 2012 and 2022 to allow us to summarize the most recent information. An expansion of the search terms along with the specific terms used for each database and the final search results can be found in Tables S2-S4 and Appendix S5 of the Online Supplementary Document.

Retrieved articles were compiled in EndNote, de-duplicated, and uploaded into Rayyan for screening. A blinded two-stage screening was performed with two independent reviewers (AJB and SAAR) using the inclusion and exclusion criteria outlined in [Table 2](#). Inclusion criteria included a focus on HPV and/or cervical cancer with information related to knowledge, attitudes, practices, and/or interventions, targeted FSW, research conducted in Africa between January 2012 and August 2022 that was published in English. Papers focused only on incidence, prevalence or genotypes of HPV and CC were excluded as these were not focused on knowledge, attitudes, practices, or interventions.

A total of 152 articles were retrieved from the four databases. After automated de-duplication, 79 articles remained for screening of abstracts and titles. Following ini-

Table 1. Population, Concept, Context Model used to guide the development of the inclusion and exclusion criteria for the study.

Criteria	Determinants
Population	Female Sex Workers
Concept	Prevention of HPV and Cervical Cancer
Context	Africa

Table 2. Inclusion and exclusion criteria used to select appropriate articles for the review.

Inclusion Criteria	Exclusion Criteria
Focus on HPV and/or Cervical Cancer	No focus on HPV and/or CC
Related to knowledge, attitudes, practices, or interventions	Focused solely on incidence, prevalence or genotypes of HPV and CC
Female Sex Workers	Not targeting FSW specifically
Conducted in Africa	Not performed on African continent
January 2012-August 2022	Published prior to January 2012 or after the search was conducted in August 2022
Published in English	Not published in English

tial screening of title and abstract, the authors included 10 articles in consensus meeting; 3 of these were conflicts in the initial screening and 7 were articles that both authors marked for further discussion. Of the three conflicts, all were excluded following discussion as they did not include information related to knowledge, attitudes, practices, or interventions. Of the seven articles of which both authors were indecisive, five were included in full-text screening and two were found in discussion to not meet inclusion criteria.

Full-text screening was performed on the 15 remaining articles. Of those, 11 met the eligibility criteria for the study. A summary of the full text screening of the 15 articles can be found in Table S6 of the Online Supplementary Document. The PRISMA diagram in [Figure 1](#) summarizes the study selection process.³³ The major reasons for exclusion were that the study was not related to knowledge, attitudes, practices, or interventions. Many of the excluded studies focused on incidence and prevalence only.

DATA EXTRACTION AND ANALYSIS

A data extraction template modified from recommendations in the JBI Manual for Evidence Synthesis was used to identify pertinent study information which is outlined in [Table 3](#).³⁴ A broad extraction template was used to accommodate the heterogenous studies. Quality appraisal was completed using the Mixed Methods Appraisal Tool (MMAT) developed from McGill University which assesses each study based on the study type.³⁵ Each study was categorized as a KAP study, intervention study, or both, and was further analysed based on the classification. The KAP studies were grouped based on the outcomes assessed (i.e. knowledge vs attitude vs practices, etc.) and analysed to understand key findings in these areas. The interventions were grouped based on their intervention design and

analysed using the Logic Model for Comprehensive CC Prevention developed by Shin et al.³⁶ This model provides a framework to guide CC elimination in LMICs. Each intervention was classified as to how it fits into the model and assessed for its impact, strengths, and weaknesses. This included evaluation and classification of the activities using the following categories (1) policy makers, (2) production and supply, (3) healthcare system, (4) providers and health workers, and (6) community. Finally, outcomes were divided into primary prevention, secondary prevention, or both. Key themes were identified within varying groupings as well as throughout the KAP and interventions collectively.

RESULTS

Eleven articles were found to meet the inclusion and exclusion criteria for the study and are briefly summarized in [Table 4](#) (for complete data extraction see Appendix Table S6 of the Online Supplementary Document). Six countries were represented in the articles as follows: Kenya (3), Ethiopia (2), Nigeria (2), Mozambique (2), South Africa (1), and Uganda (1). The map in [Figure 2](#)³⁷ shows the studies distributed across the continent. The study characteristics varied greatly regarding sample size, recruitment techniques, etc. Of the eleven articles, 5 were categorized as KAP and 6 were categorized as interventions. None of the articles directly pertained to both an intervention and KAP.

FSW KNOWLEDGE, ATTITUDES, AND PRACTICES (KAP)

Of the 5 articles related to KAP, 3 contained information pertaining to FSW knowledge, 3 contained information pertaining to attitudes, and all 5 contained information pertaining to preventative practices. [Table 5](#) outlines the five

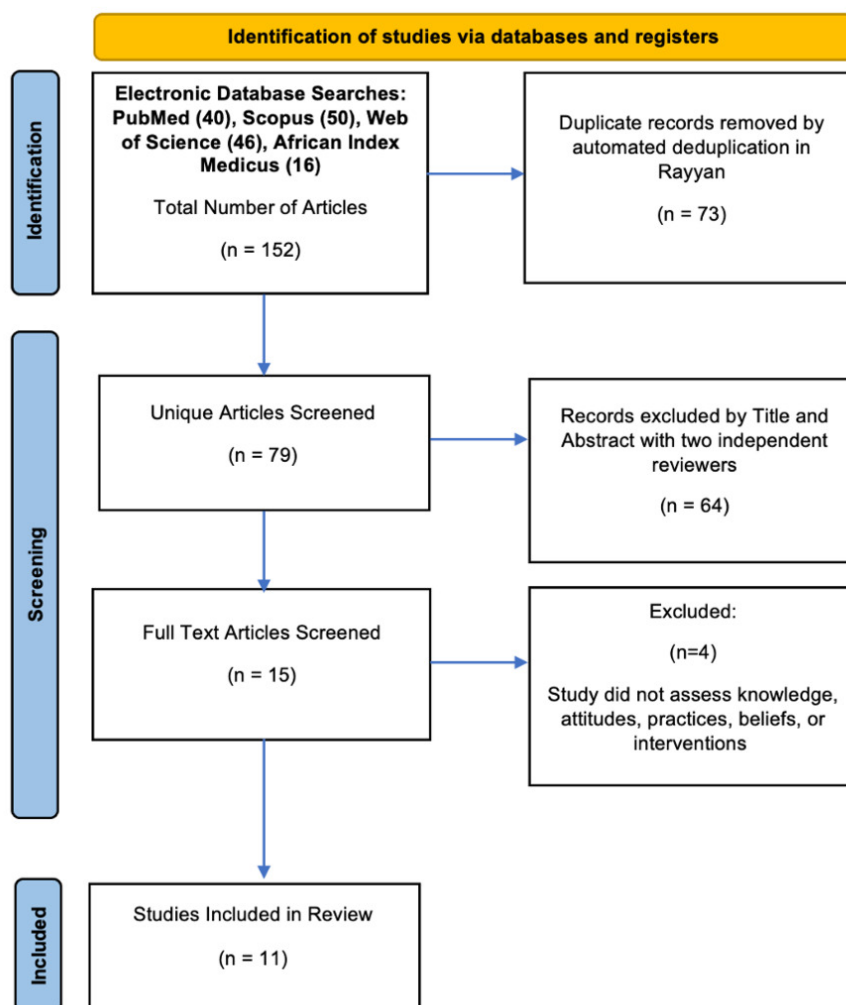


Figure 1. PRISMA diagram outlining the identification of studies included in the review.³³

articles and their corresponding categories. The KAP articles covered 3 African countries with two studies performed in Ethiopia, two in Nigeria, and one in Mozambique. All the KAP studies used interviewer-administered questionnaires with varying content.

KNOWLEDGE

Three of the five KAP studies contained information pertaining to knowledge of CC.³⁸⁻⁴⁰ Muluneh et al.⁴⁰ used a case-control format and reported aggregate data only from a cohort in Bahir Dar City, Ethiopia. The study did not report on question-specific information. The cases were FSW who accepted CC screening, and the controls were those who did not accept CC screening. In this study, the goal was to compare knowledge sufficiency between cases and controls. The study only had an uptake in screening of 13%, and therefore, the study had less cases than controls. Knowledge was rated “sufficient” if it was greater than the mean score; 57% of controls had sufficient knowledge as compared to only 37% of cases ($\chi^2(1, N=116)=5.993$, $P=0.014$).⁴⁰ In the study, over 50% of participants (119/219)

and 62% (108/173) of controls had unfavorable attitudes toward CC screening compared to 23% of cases.⁴⁰

Argaw et al.³⁸ and Shu et al.³⁹ utilized cross-sectional studies and reported question-specific data regarding their respective surveys in Shashemene Town, Ethiopia and Lagos, Nigeria. Argaw et al.³⁸ utilized 24-knowledge related questions and Shu et al.³⁹ utilized 11-questions to classify FSW knowledge as either good (50% correct) or poor (<50% correct). In Argaw et al.,³⁸ the mean overall score was 28% (6.7 ± 4.8 out of 24 questions), whereas in Shu et al.,³⁹ the mean score was 45% (± 24.94). In Shu et al.,³⁹ 50% of FSW were found to have “good” knowledge (208/403). In both studies, over half of the FSW knew that HPV caused CC (Argaw et al.³⁸ 58.7%, Shu et al.³⁹ 66%) and that CC was preventable (Argaw et al.³⁸ 60.3%, Shu et al.³⁹ 50.8%). However, knowledge among FSW was much lower when asked more specific questions regarding signs, symptoms, and prevention strategies.^{38,39}

On the signs- and symptoms-related questions, fewer than 30% of the FSW were informed on any single question in either of the two studies.^{38,39} Argaw et al.³⁸ asked additional questions regarding knowledge of prevention strategies. While 60% (232/385) of participants in this study knew

Table 3. Data extraction tool used to analyse the articles included in the review.

Category	Details Extracted
General Information	Author(s) Year of publication Location of Study
Study Characteristics	Study type & design Aim of intervention/study Target population(s) Methods Study setting
Study participants	Description of study population Recruitment strategies Sample size
Implementation strategies or Intervention	Description of intervention(s) Intervention populations Types of intervention(s) Duration of intervention(s)
Outcome details	Key findings Strengths of Study Weaknesses of Study
Future Work	Recommendations
Classification	KAP or Intervention or Both

that CC was preventable, only 12% (48/385) had knowledge on the appropriate frequency of screening.³⁸

Argaw et al.³⁸ also considered the sources of education and information for FSW regarding these topics. Twice as many FSW reported gaining knowledge of HPV and CC from radio and TV compared to from a healthcare professional (189/385 vs 95/385). Of the 20% (78/385) in the study who had undergone previous CC screening, 54% (42/78) had been recommended by their healthcare professional.³⁸ This suggests improved uptake when recommended and educated by a healthcare professional. Furthermore, Shu et al.³⁹ found that FSW who used condoms ($P=0.015$) or underwent Pap smear testing ($P<0.001$) were more likely to have good knowledge related to HPV and CC. Age ($P<0.001$) and monthly income ($P=0.0003$) significantly impacted knowledge as well.³⁸ Argaw et al.³⁸ found that FSW were more likely to have good knowledge if they had history of oral contraceptive use (Odds Ratio (OR)=2.19, 95% CI=1.374–3.492) or history of an STI (OR=1.86, 95% CI=1.092–3.172). Factors such as condom use, Pap smear testing, and oral contraceptive use would all necessitate conversations or interactions with healthcare providers, further supporting that interactions with healthcare providers can improve knowledge of HPV and CC and increase screening uptake. The findings in Muluneh et al.⁴⁰ were contradictory, however, showing a greater percentage of those who did not uptake in screening with greater HPV and CC knowledge (57.2% (99/173) of controls with sufficient knowledge vs 37% (17/46) of cases, $P=0.014$). However, the study also had a high percentage of unfavorable attitudes towards screening (62.4% (108/173) of controls, 23.9% (11/46) of cases, $P=0.001$) suggesting that attitudes must be addressed alongside knowledge. Furthermore, it highlights that not all healthcare interactions lead to the same outcomes emphasizing the need for targeted, appropriate outreach.

ATTITUDES

There was minimal information in the studies overall pertaining to FSW attitudes toward HPV and CC screening and prevention. Three of the five KAP studies touched on attitudes briefly.^{16,39,40} In one study, FSW expressed the need for more SRH services including CC screening specifically.¹⁶ Two studies asked specific questions related to attitudes toward screening and reported mixed findings.^{39,40} In the study in Ethiopia out of 219 FSW, 100 FSW had a favorable attitude toward screening and 119 had an unfavorable attitude.⁴⁰ Among those FSW who had previously been screened for CC, however, 76% (35/46) had a positive attitude toward screening as compared to 38% (65/184) of those who had not previously been screened ($P=0.001$).⁴⁰ In the study performed in Nigeria, 97% (392/403) of all FSW had a positive attitude toward screening, and the authors similarly found that the proportion of those with a positive attitude was greater among FSW who had previously undergone CC screening ($P=0.009$).³⁹

PREVENTATIVE PRACTICES

All 5 of the KAP articles contained information related to preventative practices for CC. Screening utilization varied greatly across the studies. In a study conducted in Mozambique, none of the 300+ participants had previously been screened.¹⁶ In contrast, in a study conducted in Nigeria, 38% (158/406) had previously been screened for CC and of those, over half (81/158) reported being screened yearly.⁴¹ Furthermore, the study reported that a majority of those who screened regularly received the services accessibly at their places of residence and work.⁴¹ Another study performed in Nigeria found that FSW had overall good preventative practices (62.28% (251/403), mean score of 56.48 ± 27.6); 37% of FSW had previously been screened for CC and

Table 4. Summary of Articles included in Review and Key Data.

First Author, Year Study Design	Study Aims	Setting or Location	Population	Methods	Outcomes	Recommendations	KAP or Intervention
Afzal et al., 2017 Cross-sectional study	Integrate screen and treat with WHO recommended Visual Inspection with Acetic Acid (VIA) into existing HIV services	Hlokomela Clinic, Limpopo Province, South Africa	HIV-positive farm workers and at-risk sex workers attending clinic for HIV counselling, treatment or follow up; ages 20+	Local nurses trained in VIA and cryotherapy with supervisory period. Patients underwent questionnaire and screening, and retrospective chart review was included.	Successful integration of Cervical Cancer (CC) screen and treat services with existing HIV infrastructure. VIA effective in low-resource, rural setting.	Need for improved infrastructure for screening and referral process for further testing and care.	Intervention: screen and treat
Argaw et al., 2022 Cross-sectional study	Assess knowledge and practices of CC among commercial sex worker women	Family Guidance Association of Ethiopia, Shashamene Town, West Arsi, Oromia Region, Ethiopia	Any commercial female sex workers (FSW) living in Shashamene Town visiting confidential clinics of the family guidance association of Ethiopia (FGAE)	Structured-interviewer administered questionnaire, 24-questions, >50% indicated "good knowledge"	Mean level of knowledge was low and only ~20% had previously been screened. History of oral contraceptives (2.19x) and history of STI (1.86x) associated with knowledge of CC prevention. Level of knowledge impacted uptake of screening with good knowledge 17x more likely to screen.	Increase knowledge by integrating CC screening into existing clinics and equipping them with audiovisual materials that will increase knowledge	KAP: Knowledge, Practices
Ilesanmi and Kehinde, 2018 Descriptive cross-sectional study	Investigate the pattern of CC screening utilization among FSW	Bwari Area Council, Abuja, Nigeria	Any FSW in Bwari Area Council of Abuja who worked in the industry for more than 6 months	Individual interviewer-administered structured questionnaire based on extensive literature search with assistance from 4 FSW	Respondents are aware of CC screening, but uptake remains low suggesting the need for educational intervention.	Urgent need to implement educational interventions focused on FSW. Screenings services should be emphasized and made accessible to all FSW at affordable costs and health education interventions are important to provide understanding of what screening services entail and why. Education and services should be provided in places where FSW live and work to improve uptake and ease of access.	KAP: Practices
Islam et al., 2020 Cross-sectional study	Compare the performance of (high risk HPV) hr-HPV mRNA testing using (self-collected) sc-DRY and sc-WET specimens for the detection of cytological high-grade cervical lesions or more severe among FSW and evaluate participants'	Ganjoni Clinic, Mombasa, Kenya	Women 18+ residing in Mombasa area who self-identify as exchanging in sex for payment in cash or in-kind at time of enrollment (excluded if previous	Participants provided 2 self-collected (sc) specimens (one stored dry and one stored wet); physician-collected specimens were also collected for hr-HPV mRNA and conventional cytology. A private room was used for the study and a nurse provided verbal and pictorial instructions for self-collection. Finally, an interview was completed to assess patient	Dry-stored specimens have similar test characteristics for high-grade cervical lesions & are a viable option for home-based cervical cancer screening programs. A majority of participants preferred physician-collected specimens, differing from previous studies.	Additional research should address patient and provider preferences and work to eliminate barriers to self-collection.	Intervention: self-collected HPV testing

First Author, Year Study Design	Study Aims	Setting or Location	Population	Methods	Outcomes	Recommendations	KAP or Intervention
	preferences for sampling methods		hysterectomy, currently pregnant or previous treatment for CC)	preference.	Low PPV for self-collected and VIA may lead to unnecessary referral or possibly treatment in case of VIA. However, in low-resource settings and populations with minimal access to screening, the potential benefits may outweigh the risk of additional screening and treatment in some high risk populations.		
Lafort et al., 2016 Cross-sectional study, mixed methods approach	Assess what HIV/SRH services are available at each site, to what extent they are adapted to the needs of FSW, to what degree FSW make use of them and what the main barriers are to use	Tete, Mozambique	FSW recruited from 6 initial seeds of different nationality	Survey, face-to-face interviews, and focus group discussions	FSW in FGD expressed dissatisfaction with public health services as a result of being asked for bribes, badly attended by care providers, stigmatization and breaches of confidentiality. This was not elucidated in the survey.	Access to and use of HIV and SRH services should be improved through reducing barriers at public facilities, broadening range of services offered, and expanding reach by targeted clinics.	KAP: Attitudes, Practices
Lafort et al., 2018 Convergent parallel mixed-methods study	Piloted a diagonal intervention which combined strengthening FSW-targeted services (vertical) with making health facilities more FSW-friendly (horizontal) and tested its effect as part of a multi-country DIFFER project	Tete, Mozambique	FSW	Structured interviews with FSW pre-intervention and focus group discussions with FSW and 2 FSW-peer educators followed by diagonal intervention. Diagonal intervention strategy combined expansion of vertical FSW-targeted SRH services with improved access horizontally to public health services.	Focus group discussions confirmed that outreach services were in high demand and greatly enhanced access. Community and home-based outreach is an effective way to rapidly increase uptake in services among this population. Trained focal persons for FSW at public facilities improved stigma and discrimination to some extent. FSW had high satisfaction with improved SRH services. Abortion and post-abortion care was a common theme stated as a need and a gap in care.	Peer educators and outreach services expanded services uptake. Even with the development of KP-friendly public facilities, targeted outreach is still needed. The increase in uptake was mainly due to vertical component of targeted outreach.	Intervention: Diagonal Intervention
Muluneh et al., 2019 Unmatched	Identify predictors for CC screening service utilization in Northwest Ethiopia	Family Guidance Association of Ethiopia,	Commercial sex workers attending sex workers'	Structured and pre-tested questionnaire adapted to local context through face-to-face interviews with trained nurses;	Level of knowledge on CC and screening was not an independent predictor for screening service utilization.	Opportunistic (integration into routine care and treatment) cervical cancer screening should be expanded in every clinic in order to increase	KAP: Knowledge, Attitudes, Practices

First Author, Year Study Design	Study Aims	Setting or Location	Population	Methods	Outcomes	Recommendations	KAP or Intervention
case-control study		Bahir Dar City, Ethiopia	confidential family guidance association of Ethiopia clinics in Northwest Ethiopia from March to December of 2016	Cases were those who accepted CC screening previously and controls were those who had declined. Knowledge and attitude measured using a 13- and 10-point scale, respectively. Score greater than or equal to the mean value was categorized as sufficient.	Controls (those who previously declined screening) were found to have higher average knowledge than cases.	uptake Sex workers who had history of STI or HIV/AIDS should be offered cervical cancer screening during first clinic contact Clinic time should be set aside for cervical cancer screening.	
Namale et al., 2021 Cross-sectional study	Understand the implementation of VIA screening programs among FSW	Good Health for Women Project Clinic (stand-alone per-urban suburban clinic) in Kampala, Uganda	FSW who were asymptomatic, healthy and previously unscreened for CC who were receiving targeted HIV prevention, care and treatment services at dedicated GHWP clinic during a 3-month routine clinic visit	5-day training of nurses and clinicians including mixture of interactive and practical sessions and discussions, followed by supervised work experience and periodic reorientation. Awareness campaigns were performed by staff using IEC materials. Face-to-face interviews with VIA and same day referral as well as follow up.	Showed feasibility of cross-facility screen and treat methodology with same day referral. High proportion of VIA positive participants were considered positive after colposcopic exam indicating high achievement of VIA. VIA positivity was more likely among HIV-positive women and those who reported >100 partners. VIA positivity less likely among women 14-24 years old. Higher burden of cervical dysplasia among previously unscreened high-risk FSW.	Strategies need to be integrated into targeted interventions that are ongoing for HIV prevention, care and support for FSW. Screen and treat on the same day is vital. Need to establish networks and collaborations among FSW-led organizations to set up acceptable and accessible health services that integrate cervical cancer and HIV/STI care.	Intervention: screen and treat
Senkomago et al., 2018 Cross-sectional study	Longitudinal comparison of hr-HPV-RNA testing of physician- and self-collected specimens for detection of high-grade lesions or worse over 24 months.	Korogocho, Nairobi, Kenya	FSW who were at least 18 years, were not in second or third trimester of pregnancy and had intact cervix.	Hr-HPV-RNA was collected every 3 months, cervical specimens for cytology were collected every 6 months over 24 months. Self-collected specimens were followed by physician-collected samples.	Prevalence of hrHPV-RNA slightly decreased over 24 months, but HSIL+ decreased substantially with no new cases detected after 12 months. Overall agreement between tests was moderate and appeared to increase over time.	Supports the use of self-collected hrHPV-RNA testing as primary screening strategy in resource limited regions where cytology not available as long as women with positive results can be assured of appropriate treatment and follow up and treatment.	Intervention: self-collected HPV testing
Shu et al., 2018 Descriptive	Evaluate the level of knowledge, attitudes, and preventative practices against HPV	FSW greater than 18 years who have been	Ikeja and Mushin local government areas of Lagos state, Nigeria	Pre-tested, structured, interviewer-administered questionnaire with open and closed ending questions	Good knowledge of HPV infection is an important factor in having a good attitude and consequently	Low knowledge and preventative practices suggest a need to organize awareness campaigns and educative lessons in the FSW community.	KAP: Knowledge, Attitudes, Practices

First Author, Year Study Design	Study Aims	Setting or Location	Population	Methods	Outcomes	Recommendations	KAP or Intervention
cross-sectional study	among FSW	involved in sex work greater than one month			good preventative practices. FSW who lived with their relatives were less likely to have good knowledge on HPV prevention as compared to their counterparts who lived alone. FSW who lived with friends were most likely to have good preventative practices against HPV infection. Younger FSW (18-34) were less likely to have good knowledge of HPV. Despite high positive attitudes reported, few had completed Pap smear.	Preventative intervention programs should be tailored to FSW. HPV programs should be placed alongside HIV programs.	
Ting et al., 2013 Cross-sectional study	Compare performance of hr-HPV mRNA testing of physician- and self-collected specimens for detecting high-grade lesions or more severe and examination of risk factors for positivity	Korogocho, Nairobi, Kenya	FSW who were at least 18 years, were not in second or third trimester of pregnancy and had intact cervix.	Self-collected cervicovaginal specimen, physician conducted pelvic exam to obtain cervical specimens (HPV testing and traditional Pap smear)	Hr-HPV self-testing may not be sufficiently specific to be stand-alone test for primary CC screening. However, has the potential to effectively identify women at higher risk for high-grade lesions without an initial gynecologic exam in limited resource settings. Prevalence of >HSIL was similar in women younger than 30 years to older (4% and 5%, respectively) suggesting that hr-HPV self-testing could be a viable option in high risk FSW populations 18-29 years in Kenya.	Despite potential limitations, increased use of self-collection should be done in epidemiological studies. Future work should address if self-collection can improve screening coverage.	Intervention: self-collected HPV testing

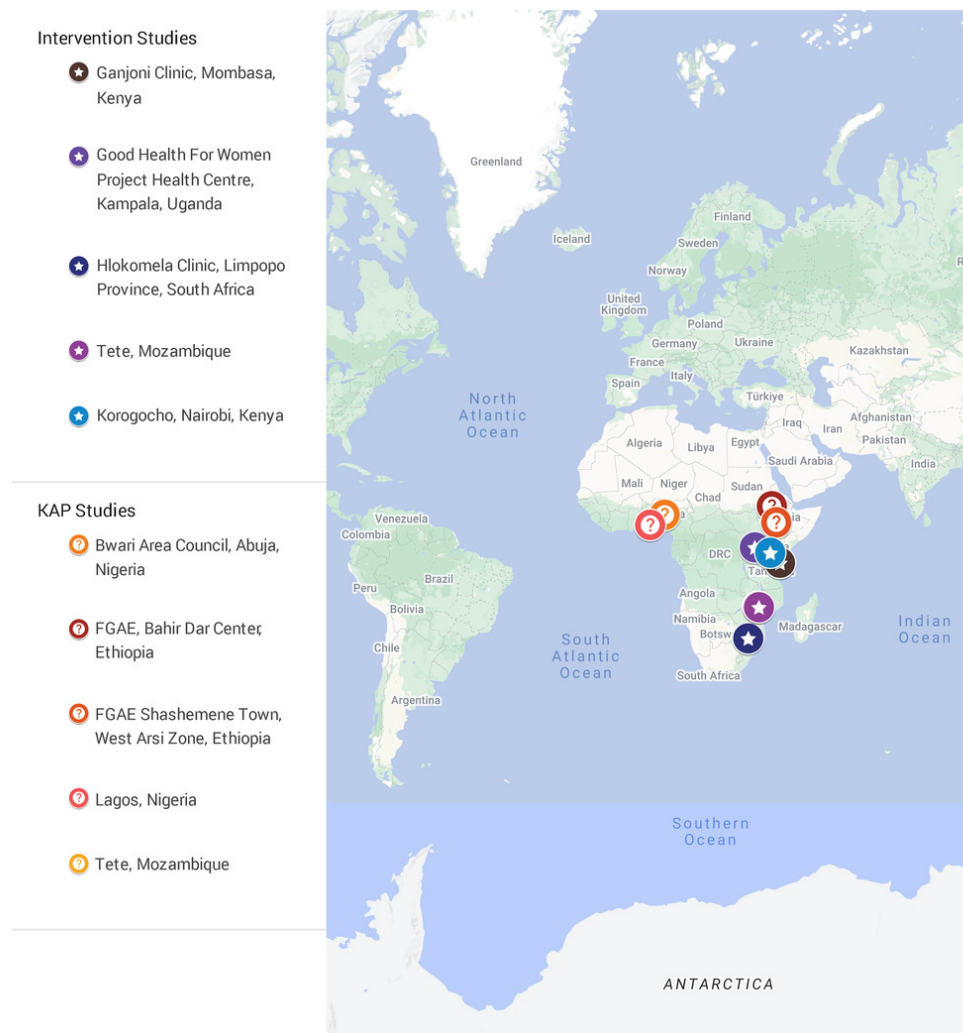


Figure 2. Map of the locations of studies included in the review.³⁷

Table 5. Categorization of KAP studies included in the review.

Study & Location	Knowledge	Attitudes	Practices
Argaw et al. 2022, Ethiopia	X		X
Ilesanmi and Kehinde 2018, Nigeria			X
Lafort et al. 2016		X	X
Muluneh et al. 2019, Ethiopia	X	X	X
Shu et al. 2018, Nigeria	X	X	X

78% underwent regular health clinic checkups.³⁹ In a study in Ethiopia, 20% (78/385) had been previously screened and most of those had been advised by a health professional (53.85%, 42/78) and/or a relative (44.87%, 35/78).³⁸ Another study in Ethiopia found that a lower proportion of sex workers who participated in the study utilized the services if they had previously undergone a pelvic exam (AOR=0.21; 95% CI=0.1-0.68).⁴⁰

Several different reasons for not screening were given in the studies. Some of the common reasons seen across multiple studies included: fear of positive test results,³⁸⁻⁴⁰ not being sick or currently feeling healthy,^{38,40} and lack

of accessibility or clinic time.^{40,41} Other reasons included greater health or life issues,³⁸ lack of time,⁴¹ fear of pain,³⁹ and in one study, a majority gave no reason.⁴¹ In one of the studies performed in Ethiopia, those with a good level of knowledge were 17 times more likely to utilize CC screening services than those with a poor level of knowledge (aOR=17.216; 95% CI=7.092-41.793).³⁸ In Nigeria, living situation was correlated to preventative practices; those who lived with friends and other FSW were more likely to have good preventative practices than their counterparts who lived alone (OR=2.17; 95% CI=1.10-3.49, $P=0.0276$).³⁹

Table 6. Categorization and thematic analysis using the Logic Model for CC Prevention in LMICs for Intervention studies included in the review.

Type of Intervention	Study, Location	Major Prevention Strategy for the Intervention	Activities of the Intervention
Screen and Treat	Afzal et al. 2017, South Africa	Secondary Prevention	- Healthcare system - Providers & healthcare workers
	Namale et al. 2021, Uganda	Secondary Prevention	- Healthcare system - Providers & healthcare workers - Community
Self-Collection HPV Testing	Islam et al. 2020, Kenya	Secondary Prevention	- Healthcare system - Providers & healthcare workers - Community
	Senkomago et al. 2020, Kenya	Secondary Prevention	- Healthcare system - Providers & healthcare workers
	Ting et al. 2013, Kenya	Secondary Prevention	- Healthcare system - Providers & healthcare workers - Community
Diagonal Intervention	Lafort et al. 2018, Mozambique	Secondary Prevention & Primary Prevention	- Policy makers - Healthcare system - Providers & healthcare workers - Community

INTERVENTIONS

Six of the eleven articles described interventions. Three models were identified including “screen and treat” using VIA (two studies), self-collection HPV testing (three studies), and a “diagonal intervention” (one study). When assessed using the Logic Model for CC Prevention which maps the needs for CC elimination in LMICs, all of the interventions included secondary prevention strategies.⁴²⁻⁴⁷ Only the “diagonal intervention” from Lafort et al.⁴⁷ included a primary prevention strategy. All six of the interventions included activities related to the healthcare system as well as providers and health workers.⁴²⁻⁴⁶ Five of the six interventions also included community-related activities.⁴²⁻⁴⁶ Lafort et al.⁴⁷ was the only intervention to include an activity related to policy makers. [Table 6](#) summarizes the interventions in terms of the Logic Model for CC Prevention.

SCREEN AND TREAT INTERVENTIONS

The two “screen and treat” interventions both integrated CC screening with immediate results and same-day treatment into already existing clinics for HIV prevention and/or treatment for FSW.^{42,43} Both interventions trained a small group of local nurses on the VIA technique, and one additionally trained the nurses in the study in cryotherapy.^{42,43}

Namale et al.⁴³ described their nurse training which followed WHO guidelines and utilized a 5-day training followed by 2-weeks of supervised hands-on training and peri-

odic reorientation with routine quality checks. The services were provided at an already existing HIV/STI prevention clinic for FSW on the outskirts of Kampala, Uganda, and awareness campaigns were included during health education activities to increase awareness of the screening. This intervention only assessed healthy, asymptomatic, and previously unscreened FSW. The participating FSW were screened utilizing VIA, received immediate results, and, if positive, were offered same day accompanied referral to the hospital for colposcopy and any required treatment (cryotherapy, loop electrosurgical excision procedure (LEEP), biopsy).⁴³

This study found only 6% (40/719) VIA positivity which was unexpectedly low for the given population.⁴³ Of those found to be VIA positive, 65% (26/40) completed further assessment with colposcopy with all costs covered by the Good Health for Women project, and 35% (14/40) were lost to follow-up. Of the 26 FSW assessed with colposcopy, 4 were suspected to have cancer, 20 were found with suspected precancerous lesions, and 2 were found to have only inflammation. Those with suspected precancerous lesions underwent biopsy and 14 were found to have CIN 1 or CIN 2/3; 11 of the 14 complied with same-day treatment and 8 received cryotherapy while 3 received LEEP. The 4 with suspected cancer all accepted treatment. The study posited that the low positivity rate may be due to variation in VIA interpretation. They suggest improved, competency-based training and quality assurance for nurses and clinicians performing VIA as well as routine screening services to en-

sure detection of lesions before progression to a high-grade lesion or cancer. Overall, the study found the integration of VIA screen and same-day referral into existing infrastructure to be successful. The major recommendations from the study include utilizing collaborations and networks of FSW-led organizations to set up acceptable and accessible health services to integrate CC screening and to make CC screening recommended and routine as part of HIV care and prevention targeted for FSW to reduce CC burden in this population.⁴³

The second “screen and treat” intervention from Afzal et al.⁴² integrated CC services at a rural HIV prevention clinic in Limpopo province in South Africa. In addition to VIA screening, the intervention included on-site cryotherapy at the clinic for those requiring it and follow up referral was given for any additional services such as LEEP or biopsy. While the results and cryotherapy were immediate, the intervention did not discuss accompanying the patients to follow up services. This intervention included any FSW that accepted CC screening as part of their routine HIV counseling or treatment. In Afzal et al.,⁴² there was no restriction based on symptoms or previous screening as was seen in Namale et al.⁴³ Furthermore, this intervention included a retrospective chart review of the participants to assess previous Pap smear results and follow up in order to compare the intervention to previous screening services performed at the clinic.⁴²

Of the initial cohort studied in Afzal et al.,⁴² there was a 30% (124/329) VIA positivity rate and 27.8% (27/32) among only FSW. On-site cryotherapy was completed on 91% (114/124) of those who were positive, 5% (6/24) completed referral for biopsy and further treatment, and 3.5% (4/124) were lost to follow up. At 18 months, chart review of the initial cohort showed successful results among those who returned for Pap smear or VIA. However, over half of the participants still required post-program screening. The clinic had continued performing the screening for additional patients and had reached 193 additional patients including 35.2% who underwent on-site cryotherapy.⁴² The study had success integrating CC screen and treat services into a rural HIV clinic, and additionally, included education, training, and community empowerment to ensure local ownership of the project.

The retrospective chart review was available for 54.8% (221/403) of the participants and showed 26.7% (59/221) with abnormal Pap smears in the year prior to the intervention, as compared to 30% (124/306) VIA positivity rate in the study, supporting the use of VIA as an effective screening tool. Furthermore, the chart review indicated that follow up for LEEP or cone biopsy was delayed > 6 months prior to the intervention and that patients with invasive carcinoma were often lost to follow up without evaluation. In the intervention, only 3.5% (4/124) were lost to follow up which supports the use of on-site and same-day cryotherapy treatment which was a great improvement. However, the study still found the major challenge to be the lack of infrastructure for referral and ongoing treatment.⁴²

Both interventions had success utilizing existing HIV prevention and treatment clinics that were already trusted

by the communities. Providing training to local staff ensured community empowerment and participation. The two studies found considerably different VIA positivity rates with only 6% (40/719) in Namale et al.⁴³ and 30% (124/329) in Afzal et al.⁴² These findings indicate the need for routine screening and improved quality assurance when utilizing VIA as a screening method. Although Namale et al.⁴³ utilized an accompanied referral process, 35% (14/40) were still lost to follow up treatment. Both studies showed the need for improvement in the referral process.^{42,43}

The “screen and treat” interventions were both classified as secondary prevention strategies according to the Logic Model for Comprehensive CC Prevention. Both included activities targeting the healthcare system as well as the providers and healthcare workers. Namale et al.⁴³ also included community-targeted activities such as behavior change education at the clinic.

SELF-COLLECTED HPV TESTING INTERVENTIONS

Three of the interventions examined self-collected HPV testing and all were performed in Kenya. The study performed by Ting et al.⁴⁵ was completed in Nairobi at an existing STI clinic for FSW and compared self-collected cervicovaginal samples to physician-collected specimens for high-risk HPV mRNA testing and both were compared to physician-collected specimens using conventional cytology as a standard (Pap smear). Participants were given pictorial instructions for self-collection and after self-collection, physician-collection was completed. Pap smear results were provided within 2 weeks, and referrals were provided for those with abnormal results. Overall, the physician- and self-collected samples showed similar results for detecting hrHPV mRNA and similar sensitivity for detecting CC pre-cancerous and cancerous lesions; the prevalence of positive hrHPV mRNA test was 30% (103/344) in physician-collected samples as compared to 29% (90/344) in self-collected with sensitivities of 86% and 79%, respectively. The study noted a concern for follow up and education if all testing is performed at home. Despite limitations, they suggest larger studies to determine if self-collection can improve screening coverage.⁴⁵

The next self-collection intervention was performed by Senkomago et al.⁴⁴ as a longitudinal follow up to the previous study by Ting et al.⁴⁵ and was completed at the same clinic in Nairobi over a 24-month period. HrHPV mRNA testing was completed every 3 months and cervical cytology specimens (via Pap smear) were analyzed every 6 months. Self-collected and physician-collected specimens were both assessed at each interval for comparison. Overall, there was a similar prevalence among physician- and self-collected samples over 24 months (24.3% positivity for both at 24 months) and agreement between the samples seemed to increase over time with the lowest agreement at 3 months with overall agreement of 81% (95% CI=76.9-85.7) and increasing to 93.6% (95% CI=90.3-96.8) at 24 months. The results of the intervention supported the previous study and support the use of hrHPV mRNA testing and self-collection as acceptable screening in resource-limited regions as long

as those with positive results have access to follow-up and treatment.⁴⁴

The third self-collection intervention was performed by Islam et al.⁴⁶ in Mombasa, Kenya and utilized an existing long-standing STI and HIV clinic for FSW. The intervention included comparison of dry and wet self-collected specimens, physician-collected specimens, and VIA for CC screening. The self-collection was performed in a private room and included verbal instruction first followed by pictorial diagrams with detailed instructions in the room. Each participant collected two specimens, followed by physician-collected specimen, VIA, and a conventional Pap smear. HPV prevalence was similar between self-collected (sc-wet (37%, 147/399), sc-dry (32%, 127/399)) and physician-collected (34%, 137/399) samples, and sensitivity for HSIL detection was also congruent between the samples (sc-wet: 85%, 95% CI=66-96; sc-dry: 78%, 95% CI=58-91; physician-collected: 93%, 95% CI=76-99). The specificity was highest for sc-dry (71%, 95% CI=66-76), similar between sc-wet (66%, 95% CI=61-71) and physician-collected (69%, 95% CI=64-74), and lowest for VIA (56%, 95% CI=51-62). Physician-collected samples had a 19% PPV for HSIL or greater. PPV (for HSIL or greater) among hr-HPV sc-wet and sc-dry were relatively low at 16% (95% CI=10-23) and 17% (95% CI=11-25), respectively, and both were higher than VIA at 12% (8-18). This indicates that self-collected samples and VIA may lead to unnecessary referral or possibly treatment, in the case of VIA. However, in low-resource settings and populations with little access to screening, the potential benefits may outweigh the potential for additional screening and treatment in some.⁴⁶

In the study, dry-storage specimens were ultimately found to have similar test characteristics to wet-storage specimens making them a reasonable option for home-based and self-collection CC screening programs. When comparing self-collection methods, 46% of participants preferred sc-dry to sc-wet (0.18, 95% CI=0.08-0.29). Furthermore, most participants agreed that the self-collection brush was comfortable to insert for both dry and wet specimens (88.7% (354/399) and 78.5% (313/399), respectively) and easy to understand (94.5% (377/399) and 92% (367/399), respectively). Yet approximately 60% were still concerned about using the brush properly for both self-collection methods (dry: 59.2% (236/399) and wet: 63.2% (252/399) and overall, a majority of participants (63.9%, 255/399) still preferred physician-collected sampling to the self-collected sampling techniques.⁴⁶

When assessed using the Logic Model for CC Prevention, all three of the self-collection HPV-testing interventions were classified as secondary prevention strategies and included activities related to the healthcare system, providers and healthcare workers, and the community.

DIAGONAL INTERVENTION

One of the interventions was described as a “diagonal intervention” and was performed in Mozambique as part of a larger multi-country research study called the Diagonal Interventions to Fast Forward Reproductive Health (DIF-FER) project.⁴⁷ The larger project implemented site-spe-

cific intervention projects to target major gaps. In the Tete, Mozambique area, the baseline analysis identified insufficient SRH service usage among FSW and a lack of peer outreach. The diagonal intervention increased SRH services and expanded community and peer outreach at an STI Night Clinic. It established referral services between the Night Clinic and public health institutions. Finally, it targeted the public health institutions to reduce stigma including identifying FSW-contact persons at each clinic and training them in FSW-friendly approaches. The intervention included cross-sectional surveys and focus group discussions with FSW and peer educators.⁴⁷

The focus group discussions confirmed that outreach services were in high demand and greatly enhanced access to SRH services supporting the use of community- and home-based outreach to rapidly increase uptake of services. While outreach services were successful, there was not a significant increase in FSW utilization of the Night Clinic or public health facilities other than for CC screening. None of the participants had ever been tested for CC prior to the intervention period. The screening rate increased to 17% at public health facilities during the study from mid-2014 to 2016 which coincided with the national rollout of CC screening to all public health facilities.⁴⁷

A major barrier expressed by the FSW was an inconsistent supply of services (contraceptives, testing, etc.), highlighting the need for improved infrastructure and supply chains. The study found that even with expanded services and FSW-friendly facilities, targeted community and peer outreach to these communities is vital to increase service uptake and is currently underutilized.⁴⁷

The diagonal intervention integrated both primary and secondary prevention measures according to the Logic Model for CC Prevention. The intervention included activities targeting the healthcare system, providers and healthcare workers and the community. Secondly, the intervention included policy maker activities as it overlapped with the national rollout of CC screening services at public health facilities.⁴⁷

QUALITY APPRAISAL

Limitations of each study were noted and are summarized in Appendix Table S7 of the Online Supplementary Document. Each of the studies was then assessed using the MMAT based on the category of study design and the results are summarized in Appendix Table S8 of the Online Supplementary Document. All the studies included a qualitative nonrandomized design in their study with most utilizing a cross-sectional study design. Two of the studies also included a qualitative design component in their work. The studies all met their respective criteria in the MMAT appraisal. Selection bias was a common limitation of most of the studies given the nature of the study designs and recruitment processes.

DISCUSSION

Our scoping review identified a lack of published literature regarding KAP and interventions for FSW in Africa regarding HPV and CC. The search yielded only 79 unique articles in total, and only 11 contained information pertaining to the specific topics of the study. While research has identified FSW in Africa as a KP for targeted intervention, little analysis has been done to understand the best practices for HPV and CC prevention among this population. The articles encompassed a total of only 6 of 54 African countries, representing 11% of the continent. The limited data regarding the entire FSW population in Africa highlights the importance of this review and the need for further studies in this area.

Two studies analyzed the specific knowledge of FSW; both identified significant knowledge gaps specifically related to signs, symptoms and preventative practices indicating the need for FSW-specific education programs.^{38, 39} The highest CC screening utilization rate found in any study was less than 40%.⁴¹ While some studies showed good knowledge of HPV and CC to strongly correlate with screening utilization,³⁸ there remains an underutilization of CC screening despite adequate basic knowledge and awareness of CC.^{40,41} Education is a critical component to prevention of HPV and CC in FSW, but the programs must be specific with a focus of addressing local barriers to uptake in FSW.

Two of the studies included showed that interactions with healthcare professionals can positively impact preventative practices and screening measures.^{38,39} Yet, one study showed that only about 25% of FSW had been informed about CC by a healthcare provider with over 74% gaining information from radio or TV.³⁸ Furthermore, FSW attending regular clinic visits still failed to uptake in screening in another study which also reported unfavorable attitudes to screening.⁴⁰ The major reasons for not screening among all the studies included: lack of convenient clinic time, already healthy, and lack of provider recommendation.³⁸⁻⁴⁰ The results of these studies indicate that clinic time and provider interactions are not being properly utilized to enhance screening and prevention. Enhancement of clinic interactions, group education, and dedicated clinic time may help to alleviate these issues. Misconceptions must be addressed and detailed knowledge specific to FSW must be provided. Additional outreach messages and educational information should also be developed to target those receiving information through other media sources.

A major theme across the interventions was the integration of HPV and CC services into existing SRH and/or HIV clinics and outreach programs specific for FSW. Five of the six interventions were integrated into such clinics.⁴²⁻⁴⁶ The Diagonal Intervention from LaFort et al.⁴⁷ which did not integrate into such a clinic, but analyzed the entire system found that FSW-specific clinics were in high demand and greatly increased access to screening among FSW. Future interventions should continue to build robust FSW-targeted outreach programs into existing FSW-utilized facilities while also considering additional improvements to

public health facilities to better accommodate FSW. Evidence also showed an increase in regular screening when provided at places where FSW live and work.^{38,41} Therefore, FSW community outreach programs should be utilized to include these services.

Screen and treat interventions had success integrating into existing HIV/STI clinics with site-specific methodologies. However, there is a need to improve infrastructure for the referral process.^{42,43} Variation was found among VIA positivity rates identifying the need for more standardized competency-based trainings in VIA and highlighting the importance of routine screening in low-resource settings for FSW.

Self-collection HPV testing showed success among FSW as the studies found relative concurrence between self- and physician-collected samples.⁴⁴⁻⁴⁶ A major concern among the research was how to ensure access to follow up, treatment and education if tests are completed at home.⁴⁴⁻⁴⁶ In one study, FSW found self-collection comfortable and easy to understand, but over 50% were still concerned that they may use the brush improperly.⁴⁶ Furthermore, in the same study, a majority of FSW preferred physician-collected sampling rather than self-collected.⁴⁶ Previous work has shown conflicting results when considering preference for physician- versus self-collected samples. A recent meta-analysis showed that 59% of women overall among 37 studies worldwide preferred self-collection, however, the individual studies showed wide variability from 22% to 95%.⁴⁸ Furthermore, acceptability and sensitivity of self-collection have continued to be high.^{46,48,49} It is challenging to determine whether collection preference would impact uptake if proper education and resources were made available. In some studies, nurse guidance was enough to overcome self-collection barriers.⁴⁹ Further research is needed to understand self-collection preferences among FSW and best practices for implementation, counseling, and follow-up. It is important to note that all three of the self-collection interventions included in this review were performed in Kenya. Hence, these findings may not be generalizable to other areas in Africa. Local cultural context must be considered when implementing self-collection HPV testing. Future work should develop education and resources to be provided with the tests and address how to improve acceptability and uptake of the self-collection method.

In analyzing the interventions with the Logic Model for Comprehensive CC Prevention, all six interventions were secondary prevention strategies. The diagonal intervention in Mozambique from LaFort et al.⁴⁷ included a primary prevention strategy as it incorporated tailored education and condom prevention. While secondary prevention and screening are essential, there have been no HPV vaccination programs among FSW or their children reported in the literature. Additional work should be done to target this primary prevention strategy among FSW.

This review provides a summary of available literature on KAP and interventions for HPV and CC prevention among FSW in Africa. From our knowledge, this is the first review specifically addressing KAP and interventions for FSW in Africa. Due to the relatively small number of stud-

ies, the strength of recommendations provided is limited. However, key themes and lessons were identified from the existing literature, and these findings will help to guide future program development and implementation in HPV and CC for FSW in Africa. Local culture and context must be assessed and integrated alongside these lessons to ensure future programs meet the needs of their constituents.

The major limitation to the study was the lack of published literature regarding HPV and CC prevention among FSW in Africa. The studies did not represent a significant portion of Africa or even SSA, while some countries were represented more than once. Without a greater distribution of studies, the data may not be applicable to other areas of the continent. The studies varied greatly in respect to population, local culture, study setting and design, and outcomes assessed. Therefore, findings may not be generalizable to all populations or all settings. Given the small number of studies with high variability, it was difficult to directly compare study findings and therefore, we were unable to make strong recommendations. However, the themes and lessons presented in the review will aid in future program development.

CONCLUSIONS

Although global initiatives have prioritized the elimination of CC among FSW, limited published literature exists regarding knowledge, attitudes, practices, and interventions for HPV and CC prevention among FSW in Africa.³⁸ Only 11 studies were identified specific to this topic which limited the strength of the recommendations provided. However, key themes from the studies identify important considerations that will help to guide future program development and implementation.

While FSW were found to have moderate levels of knowledge regarding HPV and CC, there was a lack of detailed and nuanced knowledge. Major gaps in knowledge included signs, symptoms, and proper prevention strategies. Successful uptake of screening was seen when services are provided in convenient locations, integrated into routine or HIV care, and healthcare workers counsel and recommend it. Three models have been attempted as intervention strategies including screen and treat using VIA, self-collection HPV testing, and a diagonal intervention. The screen and treat interventions identified a need for routine screening, quality assurance, and improved referral processes. Self-collection HPV testing showed promising results in the interventions with good sensitivity. However, more work is necessary to understand barriers to self-collection and best practices for implementation. The diagonal intervention highlighted the importance of community and peer outreach as well as FSW-targeted facilities. Future interventions should be context-specific, include improved counseling and education, and be integrated with other HIV- and STI-prevention services. Additional work should understand how the varying interventions such as screen and treat with VIA and self-collected HPV testing can be integrated alongside robust FSW-specific education and services.

This review has outlined the existing published literature on knowledge, attitudes, practices, and interventions for the prevention of HPV and CC among FSW in Africa. The lack of published literature highlights the need for increased studies and interventions targeting FSW for HPV and CC. The findings from the existing literature and the recommendations in the review will help inform next steps for HPV and CC prevention interventions among FSW in Africa.

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- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved – AJB, SAAR, JCB, RKM, OS, JDG, MMK, DK, MB, FMM, WT, AN, GM, PM, KB

DISCLOSURE OF INTEREST

The authors completed the ICMJE Disclosure of Interest Form (available upon request from the corresponding author) and disclose no conflicts of interest.

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ADDITIONAL MATERIAL

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SUPPLEMENTARY MATERIALS

Online Supplementary Document

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